Appendix O

Noise/Vibration Assessment

0 SEELY AVENUE
MIXED-USE PROJECT
NOISE AND VIBRATION ASSESSMENT

San José, California

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INTRODUCTION

The project is an application for a Planned Development Zoning, Vesting Tentative Map, and Planned Development Permit to demolish the two existing residences, fruit stand, and agricultural land to construct 1,458 residential units, approximately 55,534 gross square-feet of ground-floor retail space, a 2.51-acre public park, and a 0.11-acre domestic water well for San José Municipal Water (SJMW) on an approximately 22-acre site.

This report evaluates the project's potential to result in significant impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into three sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise and groundborne vibration, summarizes applicable regulatory criteria, and discusses ambient noise conditions in the project vicinity; 2) the Plan Consistency Analysis section discusses noise and land use compatibility utilizing policies in the City's General Plan; and, 3) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents mitigation measures, where necessary, to mitigate project impacts to a less-than-significant level.

SETTING

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (*frequency*) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is the intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA).* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an

average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level* (*CNEL*) is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level* (*DNL* or L_{dn}) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA DNL. Typically, the highest steady traffic noise level during the daytime is about equal to the DNL and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA DNL with open windows and 65-70 dBA DNL if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The DNL as a measure of noise has been found to provide a valid

correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 50 dBA DNL. At a DNL of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the DNL increases to 70 dBA, the percentage of the population highly annoyed increases to about 25-30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a DNL of 60-70 dBA. Between a DNL of 70-80 dBA, each decibel increase increases by about 3 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the DNL is 60 dBA, approximately 30-35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous or frequent intermittent vibration levels produce. The guidelines in Table 3 represent syntheses of vibration criteria for human response and potential damage to buildings resulting from construction vibration.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related groundborne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess groundborne vibration and almost exclusively to assess the potential of vibration to cause damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as paint flaking or minimal extension of cracks in building surfaces; minor, including limited surface cracking; or major, that may threaten the structural integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher. The damage criteria presented in Table 3 include several categories for ancient, fragile, and historic structures, the types of structures most at risk to damage. Most buildings are included within the categories ranging from “Historic and some old buildings” to “Modern industrial/commercial buildings”. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

TABLE 3 Reaction of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Threshold at which there is a risk of damage to fragile buildings with no risk of damage to most buildings
0.25	Strongly perceptible to severe	Threshold at which there is a risk of damage to historic and some old buildings.
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential structures
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to new residential and modern commercial/industrial structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020.

Regulatory Background – Noise

This section describes the relevant guidelines, policies, and standards established by State Agencies, Santa Clara County, and the City of San José. The State CEQA Guidelines, Appendix G, are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

State of California

State CEQA Guidelines. The California Environmental Quality Act (CEQA) contains guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. Under CEQA, noise impacts would be considered significant if the project would result in:

(a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

(b) Generation of excessive groundborne vibration or groundborne noise levels;

(c) For a project located within the vicinity of a private airstrip or an airport land use plan or where such a plan has not been adopted within two miles of a public airport or public use airport, if the project would expose people residing or working in the project area to excessive noise levels.

2022 California Building Code, Title 24, Part 2. The current version of the California Building Code (CBC) requires interior noise levels in multi-family residential units attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA DNL/CNEL in any habitable room.

2022 California Building Cal Green Code. The State of California established exterior sound transmission control standards for new non-residential buildings as set forth in the 2019 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). The sections that pertain to this project are as follows:

> **5.507.4.1 Exterior noise transmission, prescriptive method.** Wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 when the building falls within the 65 dBA L_{dn} noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway noise source, as determined by the local general plan noise element.
>
> **5.507.4.2 Performance method.** For buildings located, as defined by Section 5.507.4.1, wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas during any hour of operation.

The performance method, which establishes the acceptable interior noise level, is the method typically used when applying these standards.

Santa Clara County

Santa Clara County Airport Land Use Commission Comprehensive Land Use Plan. The Comprehensive Land Use Plan (CLUP) adopted by the Santa Clara County Airport Land Use Commission contains standards for projects within the vicinity of San José International Airport which are relevant to this project;

4.3.2.1 Noise Compatibility Policies

N-1 The Community Noise Equivalent Level (CNEL) method of representing noise levels shall be used to determine if a specific land use is consistent with the CLUP.

N-2 In addition to the other policies herein, the Noise Compatibility Policies presented in Table 4-1 shall be used to determine if a specific land use is consistent with this CLUP.

N-3 Noise impacts shall be evaluated according to the Aircraft Noise Contours presented on Figure 5.

N-6 Noise level compatibility standards for other types of land uses shall be applied in the same manner as the above residential noise level criteria. Table 4-1 presents acceptable noise levels for other land uses in the vicinity of the Airport.

Table 4 - 1

NOISE COMPATIBILITY POLICIES

LAND USE CATEGORY	CNEL					
	55-60	60-65	65-70	70-75	75-80	80-85
Residential – low density Single-family, duplex, mobile homes	*	**	***	****	****	****
Residential – multi-family, condominiums, townhouses	*	**	***	****	****	****
Transient lodging - motels, hotels	*	*	**	****	****	****
Schools, libraries, indoor religious assemblies, hospitals, nursing homes	*	***	****	****	****	****
Auditoriums, concert halls, amphitheaters	*	***	***	****	****	****
Sports arena, outdoor spectator sports, parking	*	*	*	**	***	****
Playgrounds, neighborhood parks	*	*	***	****	****	****
Golf courses, riding stables, water recreation, cemeteries	*	*	*	**	***	****
Office buildings, business commercial and professional, retail	*	*	**	***	****	****
Industrial, manufacturing, utilities, agriculture	*	*	*	***	***	****
* Generally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements. Mobile homes may not be acceptable in these areas. Some outdoor activities might be adversely affected.					
** Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Outdoor activities may be adversely affected. Residential: Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.					
*** Generally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor activities are likely to be adversely affected.					
**** Unacceptable	New construction or development shall not be undertaken.					

Source: Based on General Plan Guidelines, Appendix C (2003), Figure 2 and Santa Clara County ALUC 1992 Land Use Plan, Table 1

Source: Comprehensive Land Use Plan Santa Clara County, Norman Y Mineta San José International Airport, May 25, 2011, Amended May 23, 2019.

City of San José

City of San José General Plan. The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies with the goal of minimizing the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies in the City of San José. The following policies are applicable to the proposed project:

EC-1.1 Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state, and City noise standards and guidelines as a part of new development review. Applicable standards and guidelines for land uses in San José include:

Interior Noise Levels

- The City's standard for interior noise levels in residences, hotels, motels, residential care facilities, and hospitals is 45 dBA DNL. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard. For sites with exterior noise levels of 60 dBA DNL or more, an acoustical analysis following protocols in the City-adopted California Building Code is required to demonstrate that development projects can meet this standard. The acoustical analysis shall base required noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency over the life of this plan.

Exterior Noise Levels

- The City's acceptable exterior noise level objective is 60 dBA DNL or less for residential and most institutional land uses (Table EC-1). The acceptable exterior noise level objective is established for the City, except in the environs of the San José International Airport and the Downtown, as described below:

    - For new multi-family residential projects and for the residential component of mixed-use development, use a standard of 60 dBA DNL in usable outdoor activity areas, excluding balconies and residential stoops and porches facing existing roadways. Some common use areas that meet the 60 dBA DNL exterior standard will be available to all residents. Use noise attenuation techniques such as shielding by buildings and structures for outdoor common use areas. On sites subject to aircraft overflights or adjacent to elevated roadways, use noise attenuation techniques to achieve the 60 dBA DNL standard for noise from sources other than aircraft and elevated roadway segments.

Table EC-1: Land Use Compatibility Guidelines for Community Noise in San José

LAND USE CATEGORY	EXTERIOR NOISE EXPOSURE (DNL IN DECIBELS (DBA)) 55	60	65	70	75	80
1. Residential, Hotels and Motels, Hospitals and Residential Care[1]						
2. Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
3. Schools, Libraries, Museums, Meeting Halls, Churches						
4. Office Buildings, Business Commercial, and Professional Offices						
5. Sports Arena, Outdoor Spectator Sports						
6. Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters						

[1]Noise mitigation to reduce interior noise levels pursuant to Policy EC-1.1 is required.

Normally Acceptable:

- Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable:

- Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

Unacceptable:

- New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

Source: Envision San José 2040 General Plan, Adopted November 1, 2011, As Amended on May 16, 2019.

EC-1.2 Minimize the noise impacts of new development on land uses sensitive to increased noise levels (Categories 1, 2, 3 and 6) by limiting noise generation and by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible. The City considers significant noise impacts to occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain "Normally Acceptable;" or

- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where noise levels would equal or exceed the "Normally Acceptable" level.

EC-1.3 Mitigate noise generation of new nonresidential land uses to 55 dBA DNL at the property line when located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses.

EC-1.6 Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City's Municipal Code.

EC-1.7 Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

- Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

EC-1.11 Require safe and compatible land uses within the Mineta International Airport noise zone (defined by the 65 CNEL contour as set forth in State law) and encourage aircraft operating procedures that minimize noise.

ER-2.3 Design new development to protect adjacent riparian corridors from encroachment of lighting, exotic landscaping, noise, and toxic substances into the riparian zone.

Regulatory Background – Vibration

City of San José

City of San José General Plan. The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies to achieve the goal of minimizing vibration impacts on people, residences, and business operations in the City of San José. The following policies are applicable to the proposed project:

EC-2.3 Require new development to minimize continuous vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, including ruins and ancient monuments or building that are documented to be structurally weakened, a continuous vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A continuous vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction. Equipment or activities typical of generating continuous vibration include but are not limited to: excavation equipment; static compaction equipment; vibratory pile drivers; pile-

extraction equipment; and vibratory compaction equipment. Avoid use of impact pile drivers within 125 feet of any buildings, and within 300 feet of historical buildings, or buildings in poor condition. On a project-specific basis, this distance of 300 feet may be reduced where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction. Transient vibration impacts may exceed a vibration limit of 0.08 in/sec PPV only when and where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

Existing Noise Environment

The project site is located at 681 East Trimble Road in San José, California. Part of the site is currently developed with agricultural land and the Tsukuda Fruit Stand, all of which would be demolished to accommodate the project. The site is located in a primarily commercial area with office buildings located to the northwest, southwest, and southeast. Multifamily residences are located to the northwest of the northernmost segment of the project across Epic Way. The Coyote Creek Trail borders the site to the east. The nearest sensitive receptors to the project site are the residents of the existing apartment building northwest of the project site, as well as workers and customers at the existing commercial/office buildings located to the west of the site. Other sensitive receptors would include workers and customers at the commercial/office buildings located on the south-side of Seely Avenue.

A noise monitoring survey was conducted between Monday, November 22, 2021 and Wednesday, November 24, 2021 to document ambient noise levels at the site and in the surrounding area. The survey included three long-term measurements and four short-term measurements at the locations shown in Figure 1. The existing noise environment at the site results primarily from vehicular traffic along Montague Expressway. Secondary noise sources include vehicular traffic along Seely Avenue and distant aircraft flyovers associated with Mineta San José International Airport.

On Monday, November 22, 2021, four attended, short-term (10-minute) measurements were made to quantify existing ambient noise levels at the project site and the nearest residences to the northwest. Measurement ST-1 was located at the project site approximately 200 feet northwest of the centerline of the Montague Expressway. Measurement ST-2 was made at the northern corner of the existing 681 East Trimble Road property, located approximately 850 feet northwest of the centerline of the Montague Expressway. The primary noise source at ST-1 and ST-2 was traffic along Montague Expressway, with distant aircraft flyovers also contributing to the noise environment at ST-2. Measurements ST-3 and ST-4 were made near the Epic Apartments community and Iris Chang Park. The primary noise sources at ST-3 and ST-4 were local vehicular activity and aircraft flyovers. A summary of short-term noise measurement data is presented below in Table 4.

Long-term measurements LT-1, LT-2, and LT-3 were made starting on Monday, November 22, 2021, and concluding on Wednesday, November 24, 2021. Measurement LT-1 was made to quantify ambient noise levels at the Epic Apartments community located northwest of the project

site. Hourly average noise levels at this location typically varied from 60 to 67 dBA L_{eq} during the day and from 54 and 61 dBA L_{eq} at night. The day-night average noise level at measurement LT-1 on Tuesday, November 23, 2021 was 66 dBA DNL. Measurement LT-2 was made to quantify ambient noise levels along the southwestern border of the site along Seeley Avenue. Hourly average noise levels at this location typically varied from 61 to 65 dBA L_{eq} during the day and from 56 to 65 dBA L_{eq} at night. The day-night average noise level at measurement LT-2 on Tuesday, November 23, 2021 was 67 dBA DNL. Measurement LT-3 was made to quantify ambient noise levels along the southeastern boundary of the site along the Montague Expressway. Hourly average noise levels at this location typically varied from 70 to 75 dBA L_{eq} during the day and from 64 to 75 dBA L_{eq} at night. The day-night average noise level at measurement LT-3 on Tuesday, November 23, 2021 was 77 dBA DNL. The daily trend in noise levels at long-term measurement locations is shown in Figures 2 through 10.

TABLE 4 Summary of Short-Term Noise Measurement Data, November 22, 2021

ID	Location (Start Time)	Measured Noise Levels, dBA				Calculated DNL, dBA*	Primary Noise Sources
		L_{10}	L_{50}	L_{90}	L_{eq}		
ST-1	Coyote Creek Trail, ~200 feet northwest of Montague Expressway Centerline (12:00 pm - 12:10 pm, Monday, November 22, 2021)	66	62	54	63	66	Highway traffic.
ST-2	Coyote Creek Trail, near vacant field, ~840 feet northwest of Montague Expressway Centerline (12:20 pm - 12:30 pm, Monday, November 22, 2021)	50	48	46	48	53	Distant highway traffic, aircraft flyovers.
ST-3	680 Epic Way, on sidewalk adjacent to Epic Way (12:50 pm - 1:00 pm, Monday, November 22, 2021)	55	53	51	54	56	Local traffic, aircraft flyovers, distant highway traffic and construction noise.
ST-4	680 Epic Way, on sidewalk adjacent to Epic Way (1:10 pm - 1:20 pm, Monday, November 22, 2021)	55	47	44	52	53	Local traffic, aircraft flyovers, distant highway traffic and construction noise.

*DNL levels calculated through comparison between short-term and long-term noise levels.

FIGURE 1 Noise Measurement Locations

Source: Google Earth 2022

FIGURE 2 Noise Levels at LT-1 on Monday, November 22, 2021

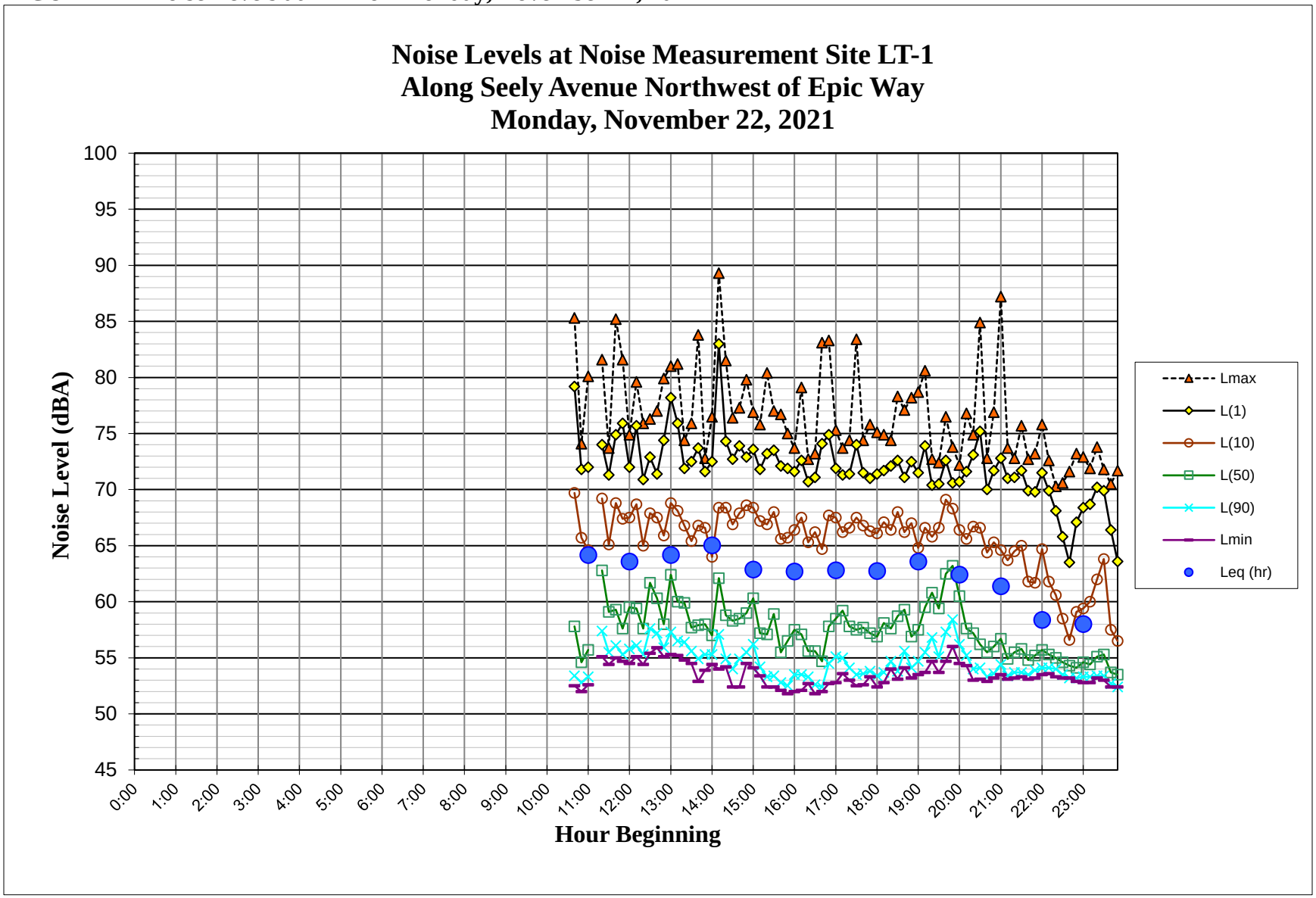


FIGURE 3 Noise Levels at LT-1 on Tuesday, November 23, 2021

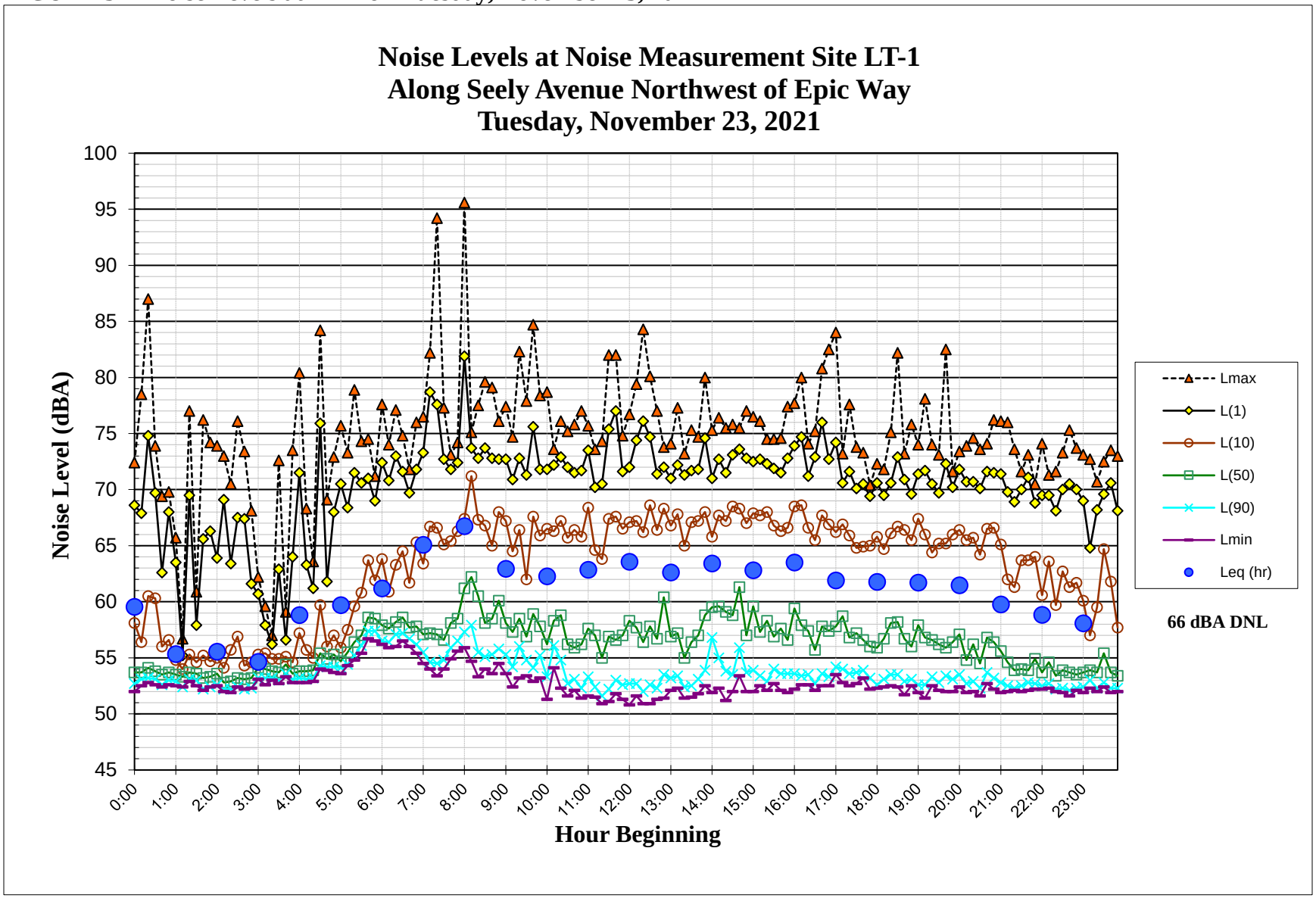


FIGURE 4 Noise Levels at LT-1 on Wednesday, November 24, 2021

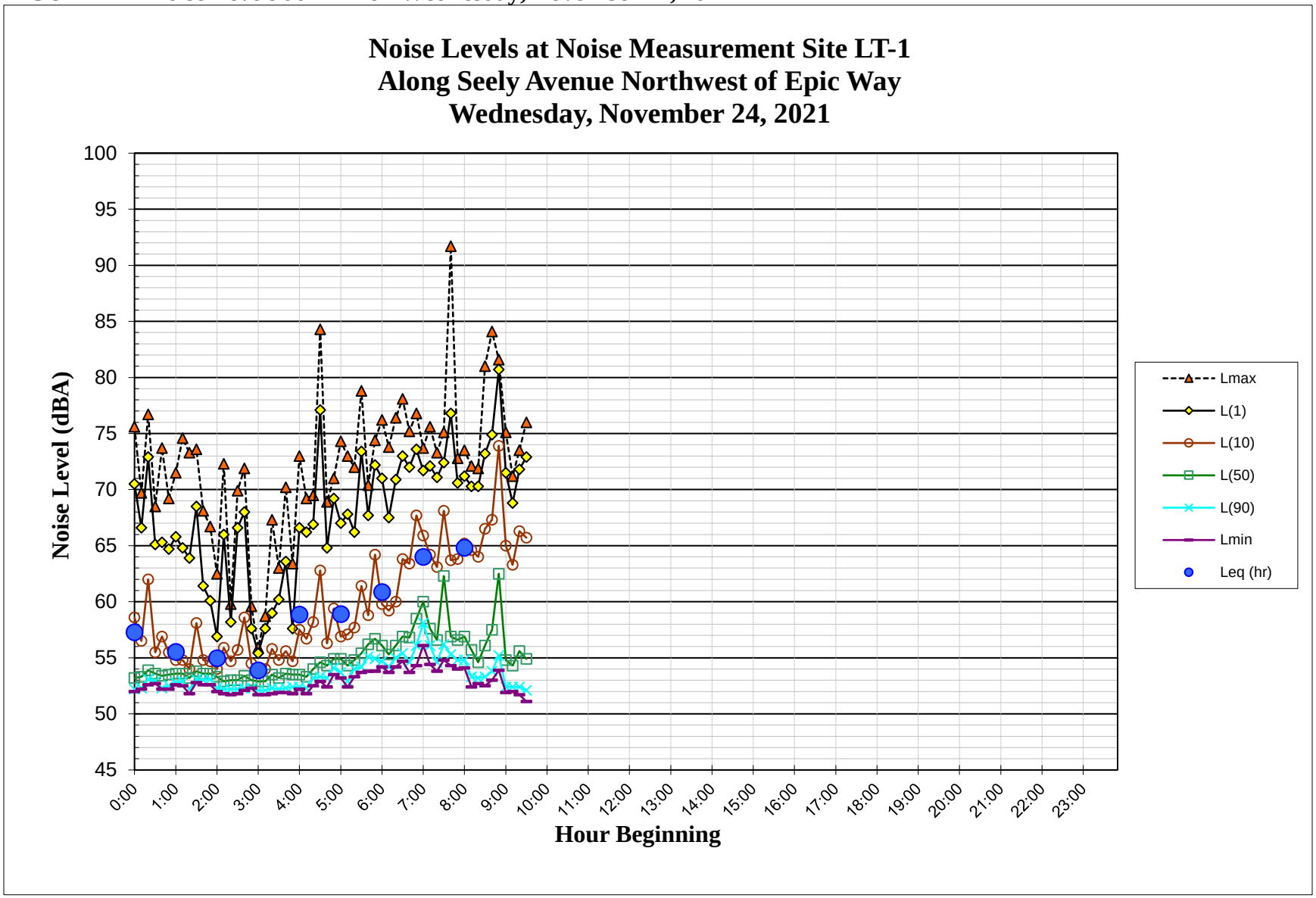


FIGURE 5 Noise Levels at LT-2 on Monday, November 22, 2021

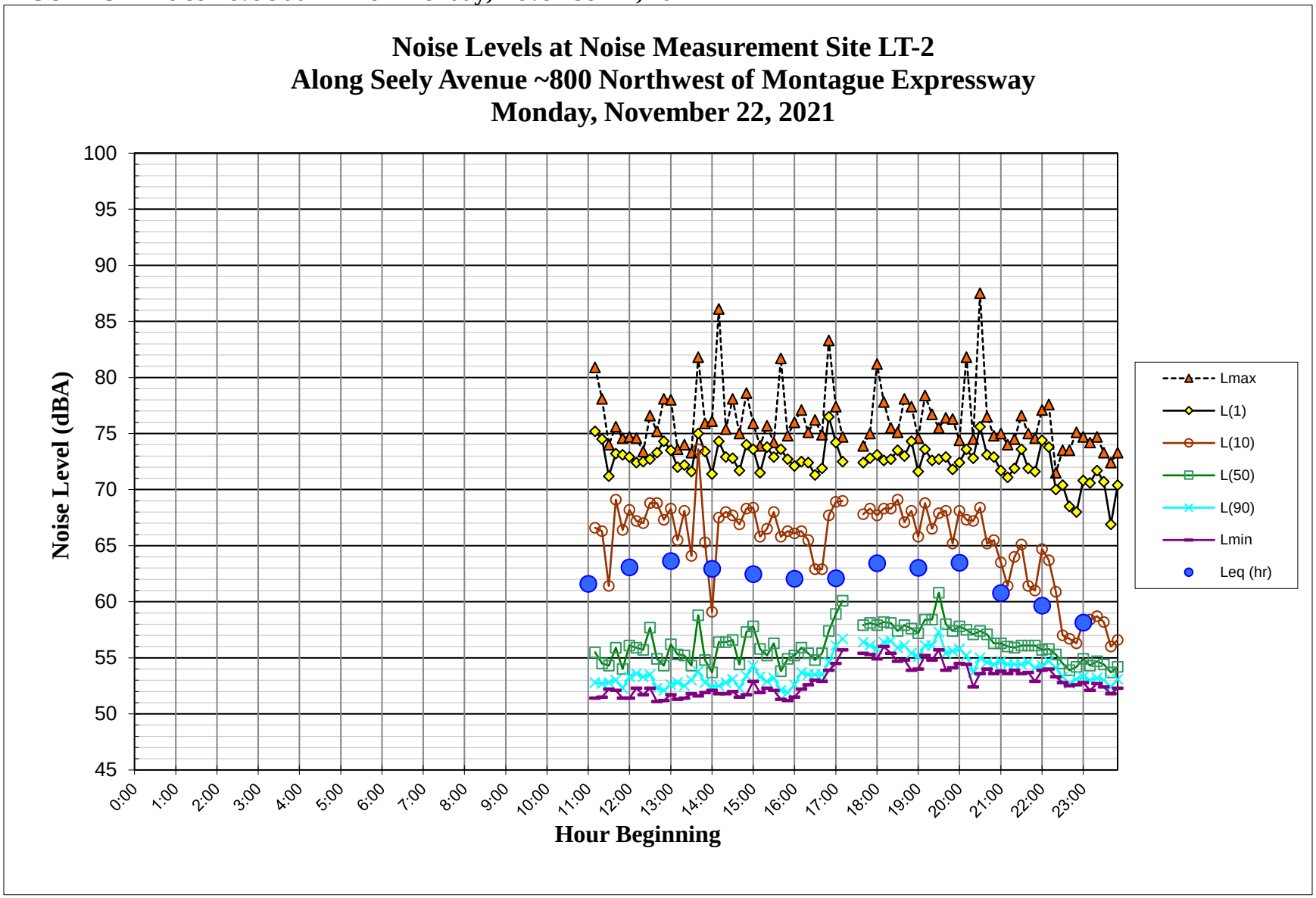


FIGURE 6 Noise Levels at LT-2 on Tuesday, November 23, 2021

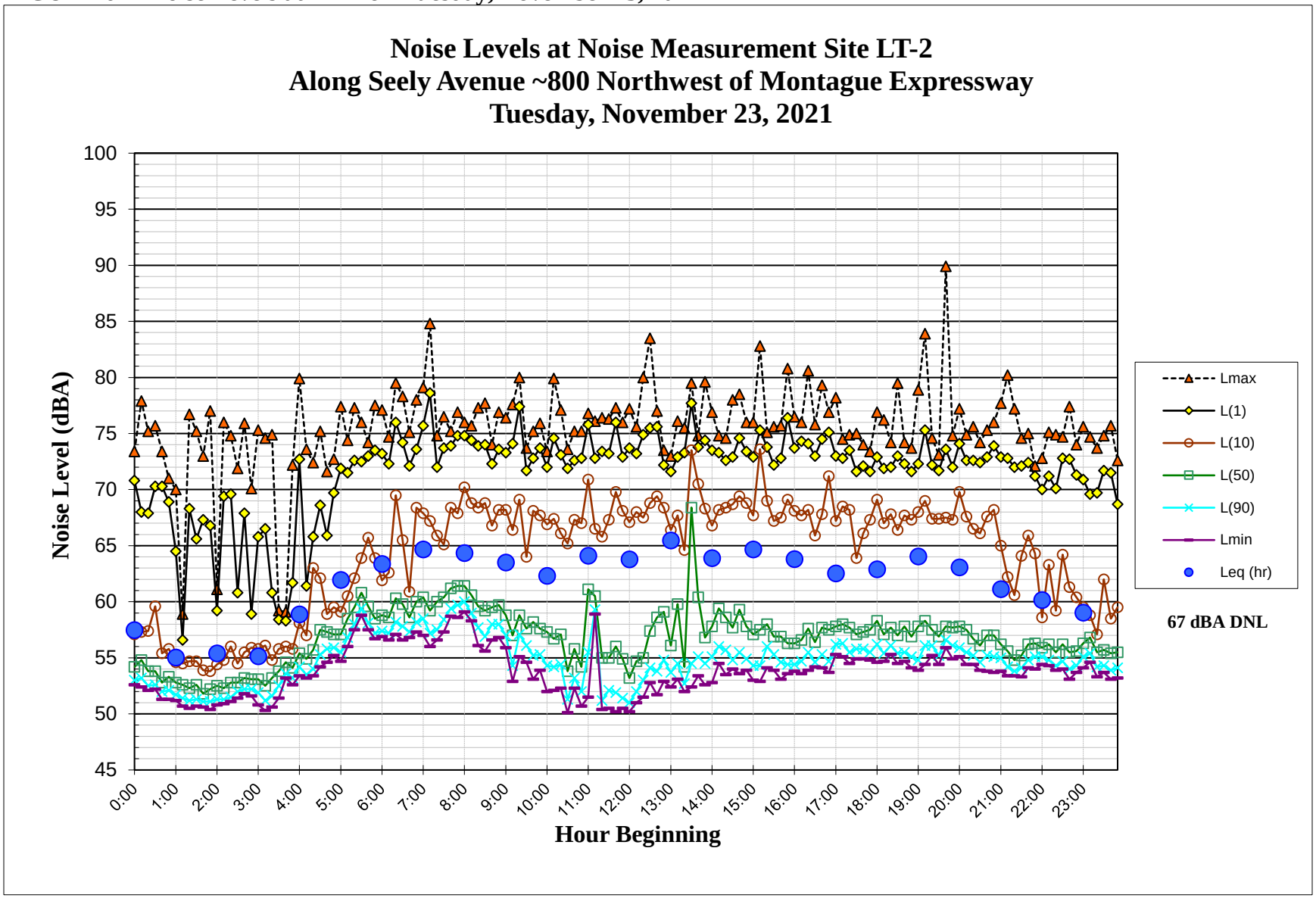


FIGURE 7 Noise Levels at LT-2 on Wednesday, November 24, 2021

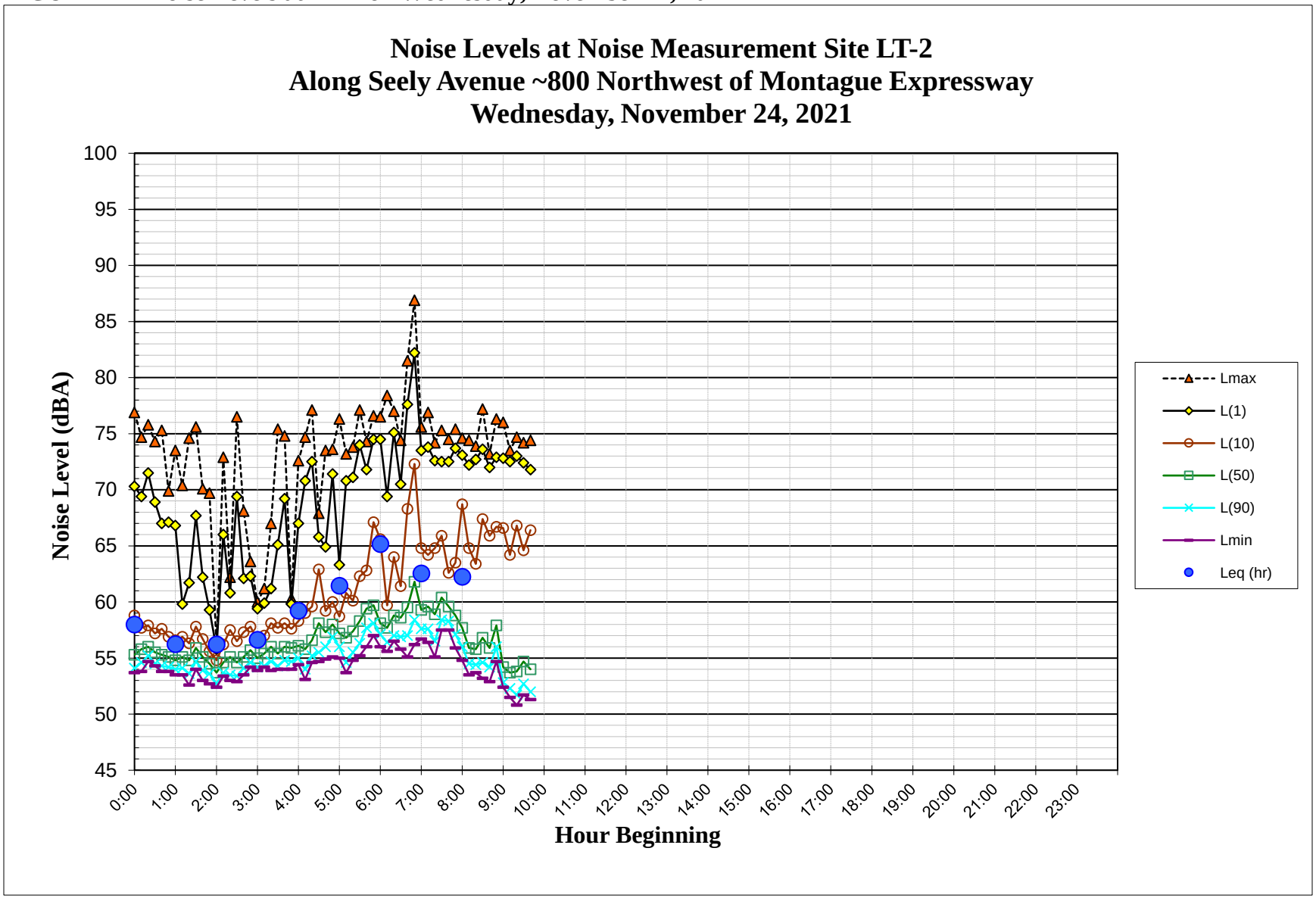


FIGURE 8 Noise Levels at LT-3 on Monday, November 22, 2021

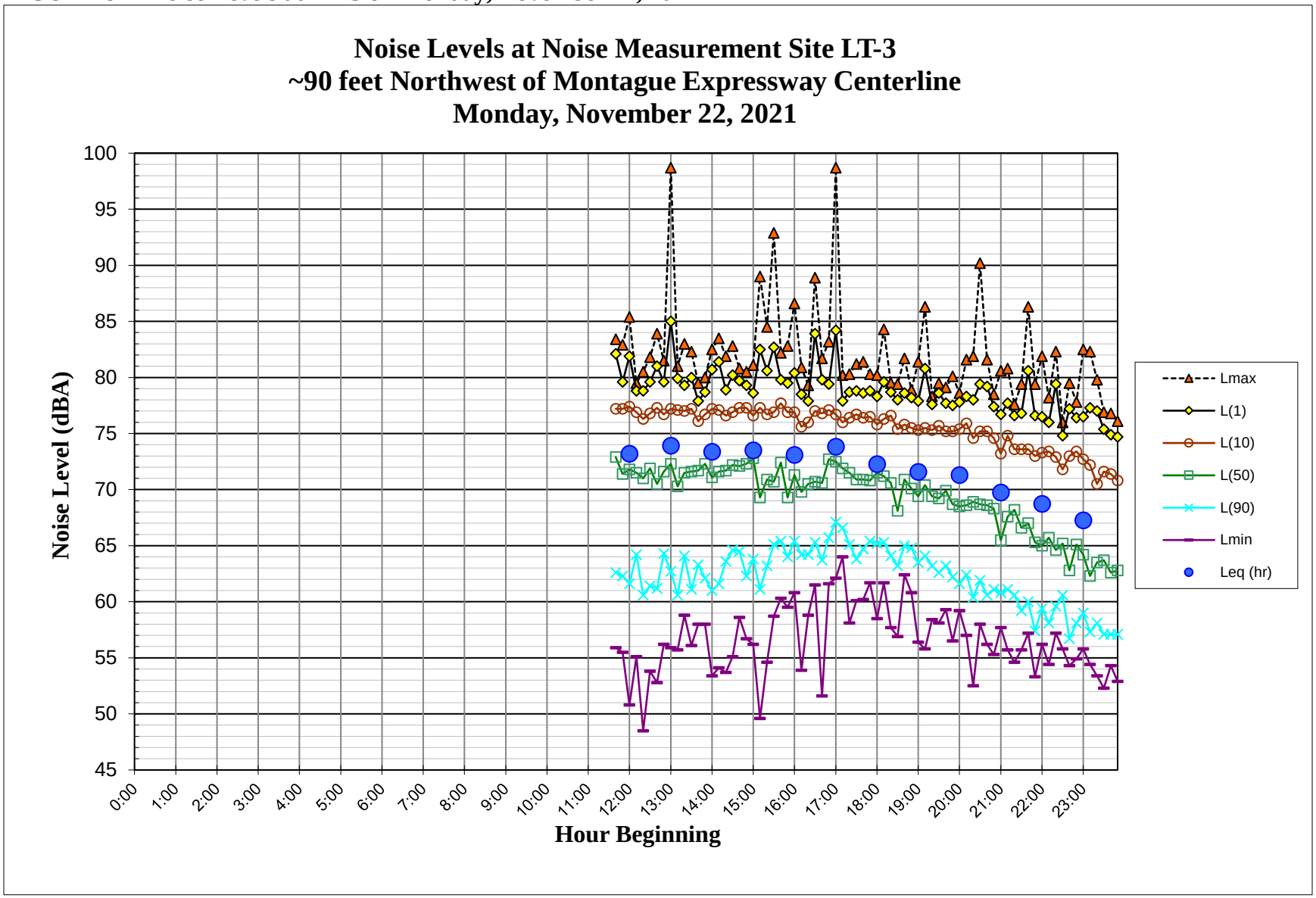


FIGURE 9 Noise Levels at LT-3 on Tuesday, November 23, 2021

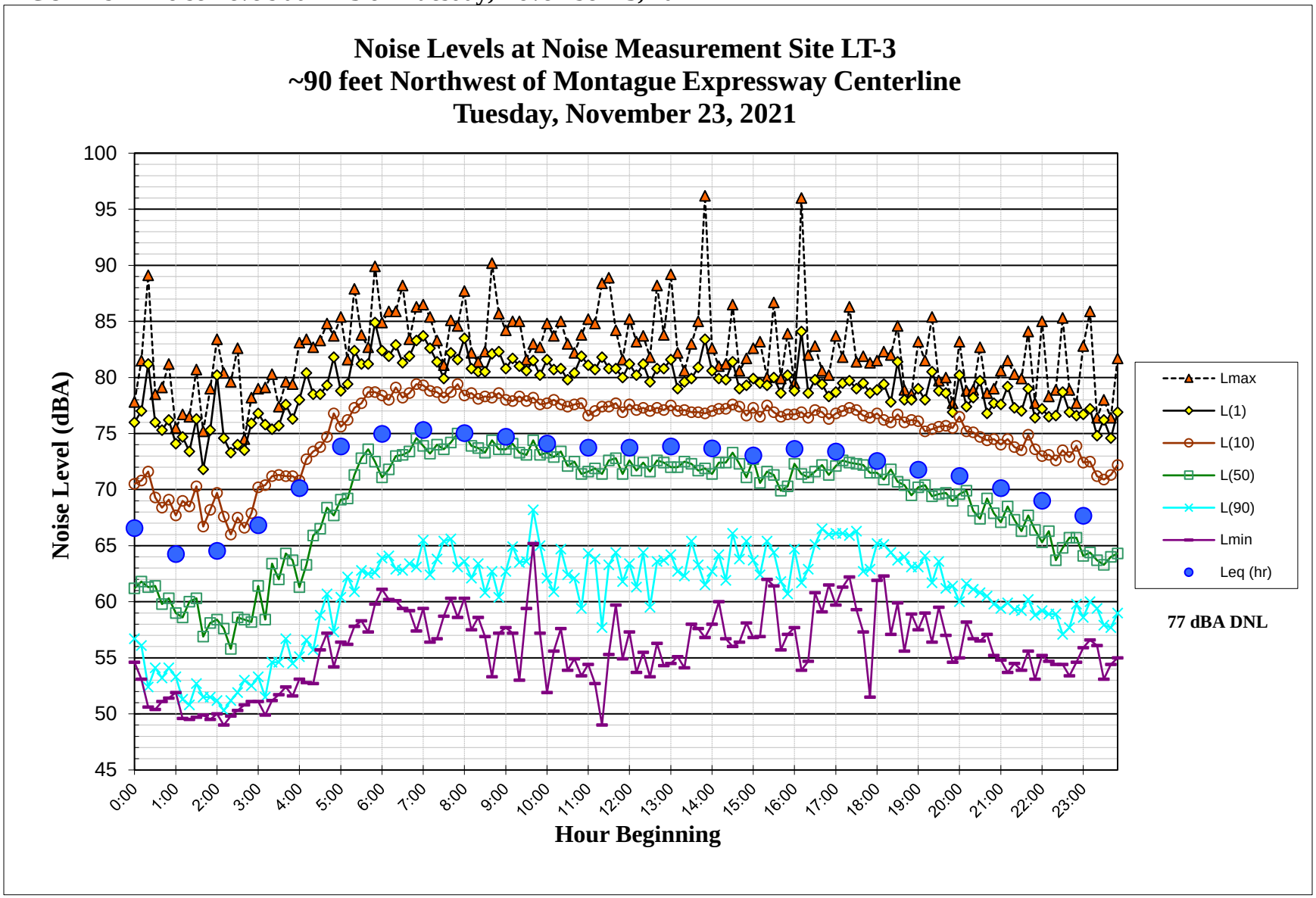
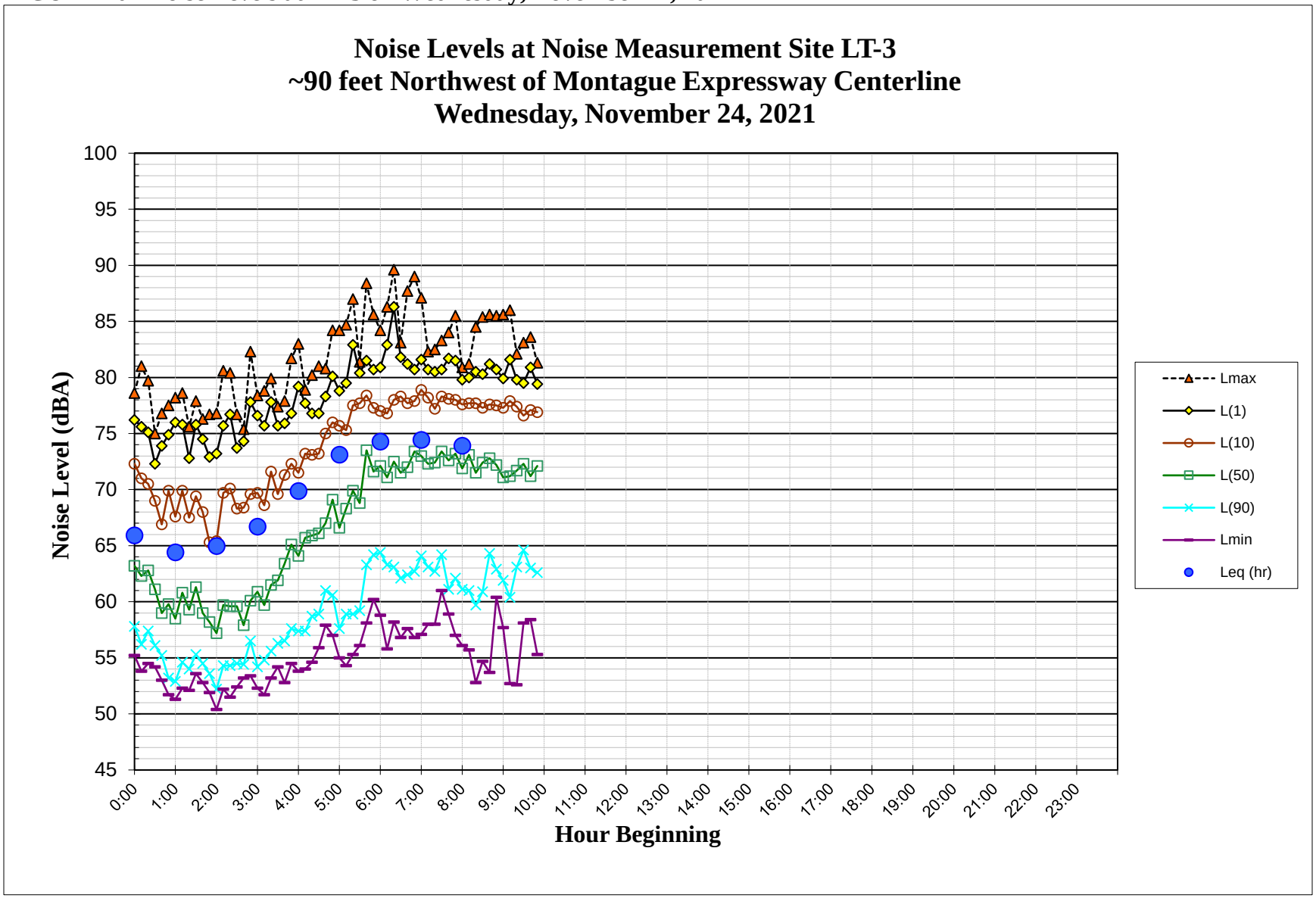


FIGURE 10 Noise Levels at LT-3 on Wednesday, November 24, 2021



PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility

The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies with the goal of minimizing the impact of noise on people through noise reduction and suppression techniques and through appropriate land use policies in the City of San José. The applicable General Plan policies were presented in detail in the Regulatory Background section and are summarized below for the proposed project:

- The City's acceptable exterior noise level standard is 60 dBA DNL or less for the proposed residential land uses.

- The City's acceptable interior noise level standard is 45 dBA DNL or less for the proposed residential land uses.

- The City's acceptable exterior noise level standard is 70 dBA DNL or less for the proposed commercial land use.

- The City's acceptable exterior noise level standard is 65 dBA DNL or less for the proposed public park land use.

- The Cal Green Code standards specify an interior noise environment attributable to exterior sources not to exceed an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas of nonresidential uses during any hour of operation.

The future noise environment at the site would continue to result primarily from vehicular traffic along nearby roadways with the Montague Expressway acting as the dominant noise source. Aircraft flyovers associated with Mineta San José International Airport would continue to act as a secondary noise source.

Future Exterior Noise Environment

Planned outdoor use areas for the project include a courtyard space with pool and a roof deck at Building 1, two podium courtyard spaces at the Affordable Building, two podium courtyard spaces at Building 2, a courtyard with pool and rooftop deck at Building 3, and a public park located along Seely Avenue in between Buildings 2 and 3. Private residential balconies would be available for some units; however, private balconies are not considered outdoor use areas subject to the City's exterior noise thresholds.

A SoundPLAN 8.2 model was created to model existing and future traffic noise at the project site. SoundPLAN 8.2 is a three-dimensional ray-tracing computer program that considers environmental geometry and sound propagation to model noise. The model was first designed and validated under existing conditions based on the noise measurement survey described above in the Existing Noise Environment section using traffic counts made in person. The model was correct to within 3 dBA and considered validated. Future traffic volumes used in the model were provided

in the May 3, 2022 Seely Avenue Mixed-use Development Draft Transportation Analysis conducted by Hexagon Transportation Consultants, Inc. and represent the Background Plus Project condition under which the proposed project is built, along with additional nearby, approved projects which use the same roadway network.

Residential Land Uses

With the exception of Affordable Building Courtyard B, the outdoor areas intended for use by residents are heavily shielded courtyards or highly elevated rooftop decks which receive a relatively low amount of direct exposure to traffic noise. The Affordable Building Courtyard B space would face the direction of Coyote Creek and Montague Expressway, the latter being the primary source of noise in the area. Elevations dated January 10, 2022 show a wall reaching about two and a half feet high surrounding this courtyard. Table 5 shows the calculated future noise levels at the proposed residential outdoor use areas.

TABLE 5 Calculated Future Exterior Noise Levels at Proposed Outdoor Use Areas

Proposed Outdoor Use	Future Noise Exposure (dBA)	
	Peak Hour ($L_{eq\ (1\text{-}hr)}$)	Day-Night Average (DNL)
Affordable Building Courtyard A	43	45
Affordable Building Courtyard B	68	**70**
Building 1 Courtyard and Pool	40	41
Building 1 Rooftop Deck	57	59
Building 2 Northern Courtyard	44	46
Building 2 Southern Courtyard	44	46
Building 3 Courtyard	39	40
Building 3 Rooftop Deck	56	58

As seen in Table 5, with the exception of Affordable Building Courtyard B, exterior noise levels at the residential outdoor use areas would not exceed the City's "normally acceptable" standard of 60 dBA DNL. With a wall along the perimeter of this courtyard reaching a height of 2.5 feet, a day-night noise level of 70 dBA DNL was calculated. Increasing the height of this wall would provide greater shielding from traffic noise originating from the Montague Expressway. Four additional courtyard wall heights were tested in the noise model. The results are shown below in Table 6.

TABLE 6 Calculated Future Exterior Noise Levels at Affordable Building Courtyard B

Courtyard Perimeter Wall Height	Future Noise Exposure (dBA)	
	Peak Hour ($L_{eq\ (1\text{-}hr)}$)	Day-Night Average (DNL)
2.5 feet (planned)	68	**70**
5 feet	66	**68**
8 feet	62	**64**
10 feet	61	**63**
12 feet	60	**62**

Increasing the height of the perimeter wall located along the edge of Affordable Building Courtyard B could reduce noise levels at the courtyard substantially. However, the 2.5-foot wall shown in the January 10, 2022 elevations would provide enough shielding to still result in a noise level that is considered to be "conditionally acceptable" according to City standards. With Affordable Building Courtyard A exposed to noise levels reaching only 45 dBA DNL, residents of this building would still have access to an outdoor use area that meets the "normally acceptable" exterior noise level criteria.

Public Land Use

The project would convert an area currently occupied by the Tsukuda Fruit Stand to a 2.5-acre public park space. The City's exterior noise exposure criteria for neighborhood parks is 65 dBA DNL. This park space would be heavily shielded from direct exposure to noise originating from traffic along the Montague Expressway by the planned Buildings 1, 2, and the Affordable Building. Seely Avenue, which experiences a much lower volume of traffic overall, would serve as a primary noise source at the park. Noise levels throughout the park were calculated and mapped using SoundPLAN 8.2. The greatest noise exposure would be along the southwestern end of the park nearest Seely Avenue, where noise levels would reach up to 64 dBA DNL at the far southern corner. More typical noise levels experienced in the center of the park and towards the northeastern end would reach 55 to 56 dBA DNL. Exterior noise levels at the park space are not expected to exceed the City's criteria of 65 dBA DNL for neighborhood parks.

Future Interior Noise Environment

Residential Land Uses

Standard residential construction provides approximately 15 dBA of exterior-to-interior noise reduction, assuming the windows are partially open for ventilation. Standard construction with the windows closed provides approximately 20 to 25 dBA of noise reduction in interior spaces. Where exterior noise levels range from 60 to 65 dBA DNL, the inclusion of adequate forced-air mechanical ventilation is often the method selected to reduce interior noise levels to acceptable levels by closing the windows to control noise. Where noise levels exceed 65 dBA DNL, forced-air mechanical ventilation systems and sound-rated construction methods are normally required. Such methods or materials may include a combination of smaller window and door sizes as a percentage of the total building façade facing the noise source, sound-rated windows and doors,

sound rated exterior wall assemblies, and mechanical ventilation so windows may be kept closed at the occupant's discretion.

Residential units are located along most façades of most floors of Buildings 1, 2, 3, and the Affordable Building. Building 2 is an exception as it would include 2 floors of retail and parking and a third floor of parking alone with residences located at the 4th floor at the lowest. Residential units located on the eastern façades of the Affordable Building and Building 2 would experience the greatest total noise exposure due to the proximity to Montague Expressway. Noise exposures at individual building façades, on multiple levels, were calculated using SoundPLAN 8.2. Calculated noise levels at worst-case positions of each façade location along with interior noise levels assuming windows in open and closed positions are shown below in Table 7. Exterior-to-interior noise level reductions of 15 dBA and 25 dBA are assumed for windows open and windows closed, respectively.

TABLE 7 Calculated Future Exterior Façade Noise Exposures and Interior Noise Levels

Location		Peak Hour ($L_{eq\ (1\text{-}hr)}$)			Day-Night Average (DNL)		
		Exterior	Interior		Exterior	Interior	
			Windows Open	Windows Closed		Windows Open	Windows Closed
Affordable Building Southeast Facade	Floor 1	70	**55**	45	72	**57**	**47**
	Floor 2	72	**57**	**47**	74	**59**	**49**
	Floor 3	72	**57**	**47**	74	**59**	**49**
	Floor 4	73	**58**	**48**	75	**60**	**50**
	Floor 5	73	**58**	**48**	75	**60**	**50**
	Floor 6	73	**58**	**48**	75	**60**	**50**
Affordable Building Southwest Façade	Floor 1	64	**49**	39	66	**51**	41
	Floor 2	67	**52**	42	69	**54**	44
	Floor 3	69	**54**	44	71	**56**	**46**
	Floor 4	69	**54**	44	71	**56**	**46**
	Floor 5	69	**54**	44	71	**56**	**46**
	Floor 6	69	**54**	44	71	**56**	**46**
Affordable Building Northeast Façade	Floor 1[1]	N/A	N/A	N/A	N/A	N/A	N/A
	Floor 2	68	**53**	43	70	**55**	45
	Floor 3	69	**54**	44	71	**56**	**46**
	Floor 4	69	**54**	44	71	**56**	**46**
	Floor 5	69	**54**	44	71	**56**	**46**
	Floor 6	69	**54**	44	71	**56**	**46**

Location		Peak Hour ($L_{eq\ (1\text{-}hr)}$)			Day-Night Average (DNL)		
		Exterior	Interior		Exterior	Interior	
			Windows Open	Windows Closed		Windows Open	Windows Closed
Affordable Building Northwest Façade	Floor 1[1]	N/A	N/A	N/A	N/A	N/A	N/A
	Floor 2	57	42	32	59	44	34
	Floor 3	58	43	33	60	45	35
	Floor 4	59	44	34	61	**46**	36
	Floor 5	59	44	34	61	**46**	36
	Floor 6	60	45	35	62	**47**	37
Building 1 Southeast Façade	Floor 1	63	**48**	38	65	**50**	40
	Floor 2	63	**48**	38	65	**50**	40
	Floor 3	64	**49**	39	66	**51**	41
	Floor 4	65	**50**	40	67	**52**	42
	Floor 5	65	**50**	40	67	**52**	42
	Floor 6	65	**50**	40	67	**52**	42
	Floor 7	66	**51**	41	68	**53**	43
Building 1 Southwest Façade	Floor 1	57	42	32	58	43	33
	Floor 2	57	42	32	58	43	33
	Floor 3	57	42	32	58	43	33
	Floor 4	58	43	33	59	44	34
	Floor 5	58	43	33	59	44	34
	Floor 6	58	43	33	59	44	34
	Floor 7	59	44	34	60	45	35
Building 1 Northeast Façade	Floor 1	56	41	31	58	43	33
	Floor 2	59	44	34	61	**46**	36
	Floor 3	60	45	35	62	**47**	37
	Floor 4	60	45	35	62	**47**	37
	Floor 5	60	45	35	62	**47**	37
	Floor 6	61	**46**	36	63	**48**	38
	Floor 7	61	**46**	36	63	**48**	38

Location		Peak Hour ($L_{eq\ (1\text{-}hr)}$)			Day-Night Average (DNL)		
		Exterior	Interior		Exterior	Interior	
			Windows Open	Windows Closed		Windows Open	Windows Closed
Building 1 Northwest Façade	Floor 1	50	35	25	51	36	26
	Floor 2	50	35	25	51	36	26
	Floor 3	54	39	29	55	40	30
	Floor 4	55	40	30	56	41	31
	Floor 5	54	39	29	55	40	30
	Floor 6	52	37	27	53	38	28
	Floor 7	52	37	27	53	38	28
Building 2 Southeast Façade	Floor 1	79	**64**	**54**	81	**66**	**56**
	Floor 2	79	**64**	**54**	81	**66**	**56**
	Floor 3	79	**64**	**54**	81	**66**	**56**
	Floor 4	79	**64**	**54**	81	**66**	**56**
	Floor 5	78	**63**	**53**	80	**65**	**55**
	Floor 6	78	**63**	**53**	80	**65**	**55**
	Floor 7	77	**62**	**52**	79	**64**	**54**
Building 2 Southwest Façade	Floor 1	70	**55**	45	72	**57**	**47**
	Floor 2	71	**56**	**46**	73	**58**	**48**
	Floor 3	72	**57**	**47**	74	**59**	**49**
	Floor 4	72	**57**	**47**	74	**59**	**49**
	Floor 5	72	**57**	**47**	74	**59**	**49**
	Floor 6	72	**57**	**47**	74	**59**	**49**
	Floor 7	72	**57**	**47**	74	**59**	**49**
Building 2 Northeast Façade	Floor 1	68	**53**	43	70	**55**	45
	Floor 2	70	**55**	45	72	**57**	**47**
	Floor 3	70	**55**	45	72	**57**	**47**
	Floor 4	71	**56**	**46**	73	**58**	**48**
	Floor 5	71	**56**	**46**	73	**58**	**48**
	Floor 6	71	**56**	**46**	73	**58**	**48**
	Floor 7	71	**56**	**46**	73	**58**	**48**

Location		Peak Hour ($L_{eq\ (1\text{-}hr)}$)			Day-Night Average (DNL)		
		Exterior	Interior		Exterior	Interior	
			Windows Open	Windows Closed		Windows Open	Windows Closed
Building 2 Northwest Façade	Floor 1	51	36	26	53	38	28
	Floor 2	53	38	28	55	40	30
	Floor 3	54	39	29	56	41	31
	Floor 4	54	39	29	56	41	31
	Floor 5	55	40	30	57	42	32
	Floor 6	55	40	30	57	42	32
	Floor 7	56	41	31	58	43	33
Building 3 Southeast Façade	Floor 1	52	37	27	53	38	28
	Floor 2	54	39	29	55	40	30
	Floor 3	55	40	30	56	41	31
	Floor 4	56	41	31	57	42	32
	Floor 5	56	41	31	57	42	32
	Floor 6	57	42	32	58	43	33
	Floor 7	57	42	32	58	43	33
Building 3 Southwest Façade	Floor 1	58	43	33	59	44	34
	Floor 2	60	45	35	61	**46**	36
	Floor 3	60	45	35	61	**46**	36
	Floor 4	60	45	35	61	**46**	36
	Floor 5	61	**46**	36	62	**47**	37
	Floor 6	61	**46**	36	62	**47**	37
	Floor 7	61	**46**	36	62	**47**	37
Building 3 Northeast Façade	Floor 1	47	32	22	49	34	24
	Floor 2	49	34	24	51	36	26
	Floor 3	52	37	27	54	39	29
	Floor 4	54	39	29	56	41	31
	Floor 5	52	37	27	54	39	29
	Floor 6	50	35	25	52	37	27
	Floor 7	48	33	23	50	35	25

Location		Peak Hour ($L_{eq\ (1\text{-}hr)}$)			Day-Night Average (DNL)		
		Exterior	Interior		Exterior	Interior	
			Windows Open	Windows Closed		Windows Open	Windows Closed
Building 3 Northwest Façade	Floor 1	51	36	26	52	37	27
	Floor 2	53	38	28	54	39	29
	Floor 3	54	39	29	55	40	30
	Floor 4	55	40	30	56	41	31
	Floor 5	55	40	30	56	41	31
	Floor 6	55	40	30	56	41	31
	Floor 7	55	40	30	56	41	31

[1] The northeast and northwest façades of the affordable building are adjacent to non-noise-sensitive indoor spaces, such as parking.

As seen in Table 7 above, some residential units could experience interior noise levels exceeding 45 dBA DNL. Project plans indicate rooftop mechanical equipment and it is anticipated that all residences and interior spaces will be equipped with forced-air mechanical ventilation, allowing for residents to close windows to control noise levels at their discretion. With windows in a closed position, interior noise levels could exceed 45 dBA DNL at residential units located along the northeast, southeast, and southwest façades of Building 2 and the Affordable Building. The townhomes would be located at an even greater distance from the primary noise sources in the area and would not be exposed to high noise levels which would exceed City thresholds.

Project elevations indicate each building would be constructed with multiple different surface materials including stucco, brick, fiber cement panels and siding, and tile, with fiber cement panels and siding being the primary material of the Affordable Building and stucco being the primary material of Building 2. A typical wall assembly including wood studs and fiberglass insulation would result in a Sound Transmission Class (STC) rating of 40 for most fiber cement panel exterior walls shown in the elevations, and an STC rating of 46 could be expected for must stucco exterior walls shown.

Assuming a calculated maximum exterior noise exposure of 75 dBA DNL and a 30% window-to-wall area ratio, the southeast façade of the Affordable Building would require windows with an STC rating of 32 or greater to reduce interior noise levels to 45 dBA DNL or less. Standard windows would provide the necessary noise reduction for residences located along other façades of the Affordable Building.

Assuming a calculated maximum exterior noise exposure of 81 dBA DNL and a 30% window-to-wall area ratio, residential units along the southeastern façade of Building 2 would require windows with an STC rating of 38 or greater to reduce interior noise levels to 45 dBA DNL or less. Alternatively, incorporating additional sound-rated construction methods into the exterior walls (e.g., adding resilient channels) could increase the STC rating of the wall to a value of about 57. With this additional measure, the southeastern façade of Building 2 would require windows

with an STC rating of 35 or greater to reduce interior noise levels to 45 dBA DNL or below. With typical stucco exterior wall construction and day-night average noise levels reaching up to 74 dBA DNL at other Building 2 façades, standard windows would suffice to reduce interior noise levels to levels not exceeding 45 dBA DNL.

Commercial Land Uses

Peak-hour noise levels at southeastern façade of the first-floor commercial use of Building 2 could reach up to 79 dBA $L_{eq\ (1\text{-}hr)}$. Project elevations show the exterior façade of this part of the building to be constructed with brick veneer. A brick veneer wall with cavity insulation could be expected to result in an STC rating of about 56. To reduce interior noise levels to not exceed the Cal Green Code limit of 50 dBA $L_{eq\ (1\text{-}hr)}$, windows and doors would need to meet a minimum STC rating of 26.

Noise Insulation Features to Reduce Future Interior Noise Levels

The following noise insulation features shall be incorporated into the proposed project to reduce interior noise levels to 45 dBA DNL or less at residential interiors:

- Provide a suitable form of forced-air mechanical ventilation, as determined by the local building official, for all residential units on the project site, so that windows can be kept closed at the occupant's discretion to control interior noise and achieve the interior noise standards.

- Preliminary calculations indicate that residential units along the southeastern façade of the Affordable Building would require windows and doors with a minimum rating of 32 STC with adequate forced-air mechanical ventilation to meet the interior noise threshold of 45 dBA DNL.

- Preliminary calculations indicate that residential units along the southeastern façade of Building 2 would require windows and doors with a minimum rating of 38 STC, or with a minimum rating of 35 STC and addition sound-rated wall construction methods resulting in a wall STC of 57 or greater, with adequate forced-air mechanical ventilation to meet the interior noise threshold of 45 dBA DNL.

- Preliminary calculations indicate that the southeastern façade of the first-floor commercial use of Building 2 would require windows and doors with a minimum rating of 26 STC with adequate forced-air mechanical ventilation to meet the Cal Green Code standard of 50 dBA $L_{eq\ (1\text{-}hr)}$.

The implementation of these noise insulation features would reduce interior noise levels to 45 dBA DNL or less at residential uses.

Conditions of Approval

A qualified acoustical specialist shall prepare a detailed analysis of interior residential noise levels resulting from all exterior sources during the design phase pursuant to requirements set forth in

the State Building Code. The study will review the final site plan, building elevations, and floor plans prior to construction and recommend building treatments to reduce residential interior noise levels to 45 dBA DNL or lower and to reduce commercial interiors to 50 $L_{eq(1\text{-}hr)}$ or below. Treatments would include, but are not limited to, sound-rated windows and doors, sound-rated wall and window constructions, acoustical caulking, protected ventilation openings, etc. The specific determination of what noise insulation treatments are necessary shall be conducted on a unit-by-unit basis during final design of the project. Results of the analysis, including the description of the necessary noise control treatments, shall be submitted to the City, along with the building plans and approved design, prior to issuance of a building permit.

NOISE IMPACTS AND MITIGATION MEASURES

This section describes the significance criteria used to evaluate project impacts under CEQA, provides a discussion of each project impact, and presents mitigation measures, where necessary, to reduce project impacts to less-than-significant levels.

Significance Criteria

The following criteria were used to evaluate the significance of environmental noise resulting from the project:

- A significant noise impact would be identified if the project would generate a substantial temporary or permanent noise level increase over ambient noise levels at existing noise-sensitive receptors surrounding the project site and that would exceed applicable noise standards presented in the General Plan at existing noise-sensitive receptors surrounding the project site.

    - A significant noise impact would be identified if construction-related noise would temporarily increase ambient noise levels at sensitive receptors. The City of San José considers large or complex projects involving substantial noise-generating activities and lasting more than 12 months significant when within 500 feet of residential land uses or within 200 feet of commercial land uses or offices. After a period of 12 months, a significant temporary noise impact would occur if construction noise levels would exceed 80 dBA L_{eq} at residential land uses near the site or 85 dBA L_{eq} at commercial land uses near the site.

    - A significant permanent noise level increase would occur if the project would result in: a) a noise level increase of 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) a noise level increase of 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater.

    - A significant noise impact would be identified if the project would expose persons to or generate noise levels that would exceed applicable noise standards presented in the General Plan.

- A significant impact would be identified if the construction of the project would generate excessive vibration levels at surrounding receptors. Groundborne vibration levels exceeding 0.08 in/sec PPV would have the potential to result in cosmetic damage to historic buildings, and groundborne vibration levels exceeding 0.2 in/sec PPV would have the potential to result in cosmetic damage to normal buildings.

- A significant noise impact would be identified if the project would expose people residing or working in the project area to excessive aircraft noise levels.

Impact 1a: **Temporary Construction Noise.** Existing noise-sensitive land uses would be exposed to a temporary increase in ambient noise levels due to project construction activities. **This is a significant impact.**

The project is scheduled to start construction in 2024 and complete construction within approximately 51 months. The construction schedule for the project assumes a start date of February 2024 to begin demolition and mass grading of the site. The project is expected to be built in phases, with construction of the townhomes and Building 1 to commence in approximately April 2024. The construction duration for the townhomes will be approximately 14 months and Building 1 will be approximately 24 months. The affordable building and Building 2 will begin construction in Q4 2024 and take approximately 18 and 30 months to complete, respectively. Building 3 will begin construction in Q2 2026 and take approximately 24 months to complete. During project construction, typical construction equipment that would be used on the project site would include backhoes, dozers, pavers, mixers, trucks, air compressors, saws, and hammers. No pile driving is proposed during construction. Construction phases would include demolition, site preparation, grading, trenching, building construction, paving, and architectural coating. During each phase of construction, there would be a different mix of equipment operating, and noise levels would vary by phase and vary within phases, based on the amount of equipment in operation and the location at which the equipment is operating.

Noise impacts resulting from construction depend upon the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise-sensitive areas. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (e.g., early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction lasts over extended periods of time.

Policy EC-1.7 of the City's General Plan requires that all construction operations within the City to use best available noise suppression devices and techniques and to limit construction hours near residential uses per the Municipal Code allowable hours, which are between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday when construction occurs within 500 feet of a residential land use. Further, the City considers significant construction noise impacts to occur if a project that is located within 500 feet of residential uses or 200 feet of commercial or office uses would involve substantial noise-generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

However, the City of San José does not establish noise level thresholds for construction activities. As an alternative, this analysis uses the noise limits established by the Federal Transit Administration (FTA) to identify the potential for impacts due to substantial temporary construction noise. The FTA identifies construction noise limits in the *Transit Noise and Vibration Impact Assessment Manual*.[1] During daytime hours, an exterior threshold of 80 dBA L_{eq} shall be enforced at residential land uses, an exterior threshold of 85 dBA L_{eq} shall be enforced at commercial land uses, and 90 dBA L_{eq} shall be enforced at industrial land uses.

The typical range of maximum instantaneous noise levels for the proposed project would be 70 to 90 dBA L_{max} at a distance of 50 feet (see Table 8) from the equipment. Table 9 shows the hourly average noise level ranges, by construction phase, typical for various types of projects. The hourly average noise levels generated by construction are about 65 to 88 dBA L_{eq} for residential buildings, measured at a distance of 50 feet from the center of a busy construction site. Construction-generated noise levels drop off at a rate of about 6 dBA per doubling of the distance between the source and receptor. Shielding by buildings or terrain often result in lower construction noise levels at distant receptors.

The nearest sensitive receptors to the project site are the residents of the existing apartment building about 60 feet northwest of the project site, as well as workers and customers at the existing commercial/office buildings located about 150 feet to the west of the site.

The construction of project infrastructure and the townhomes would produce the highest noise levels at the nearest sensitive residential land uses to the northwest. Subsequent phases of the project (i.e., Building 1, the affordable building, Building 2, and Building 3) would be located 530 feet or further from these nearest residential receptors.

Equipment expected to be used during the construction of project infrastructure are summarized in Table 10, and equipment expected to be used during the construction of the townhomes are summarized in Table 11. Each table also summarizes the quantity of each type of equipment, the reference noise level at 50 feet assuming the operation of the two loudest pieces of construction equipment, and the estimated noise levels at the nearest property lines projected from the center of the construction activity by phase. Federal Highway Administration's (FHWA's) Roadway Construction Noise Model (RCNM) was used to calculate the hourly average noise levels for each phase of construction, assuming the two loudest pieces of equipment would operate simultaneously, as recommend by the FTA for construction noise evaluations. This construction noise model includes representative sound levels for the most common types of construction equipment and the approximate usage factors of such equipment that were developed based on an extensive database of information gathered during the construction of the Central Artery/Tunnel Project in Boston, Massachusetts (CA/T Project or "Big Dig"). The usage factors represent the percentage of time that the equipment would be operating at full power.

1 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, FTA Report No. 0123, September 2018.

TABLE 8 Construction Equipment 50-Foot Noise Emission Limits

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor[3]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes:

[1] Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.

[2] Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

[3] Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

TABLE 9 Typical Ranges of Construction Noise Levels at 50 Feet, L_{eq} (dBA)

	Domestic Housing		Office Building, Hotel, Hospital, School, Public Works		Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station		Public Works Roads & Highways, Sewers, and Trenches	
	I	**II**	**I**	**II**	**I**	**II**	**I**	**II**
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

I - All pertinent equipment present at site.
II - Minimum required equipment present at site.

Source: U.S.E.P.A., Legal Compilation on Noise, Vol. 1, p. 2-104, 1973.

TABLE 10 Construction Noise Levels – Project Infrastructure

Phase (Work Days)	Construction Equipment (Quantity)	Calculated Hourly Average L_{eq} (dBA) at Nearest Property Lines From Operation of Two Loudest Pieces of Construction Equipment at 50 feet and Acoustic Center of the Site				
		Noise Level at 50 feet	Residential Northwest (900 feet)	Commercial Northwest (475 feet)	Commercial Southwest (700 feet)	Commercial East/ Southeast (940 ft)
Demolition (15 days)	Excavator (1) * Rubber-Tired Dozer (1)* Tractor/Loader/Backhoe (1)	80	55	60	57	55
Site Preparation (64 days)	Grader (3)* Off-Highway Truck (3) Scraper (4) Tractor/Loader/Backhoe (3)	84	59	64	61	59
Trenching (65 days)	Tractor/Loader/Backhoe (2)*	81	56	61	58	56
Paving (66 days)	Paver (1) Paving Equipment (1)* Roller (1) Tractor/Loader/Backhoe (1)*	82	57	62	59	57

*Denotes two loudest pieces of construction equipment per phase.

TABLE 11 Construction Noise Levels – Townhomes

Phase (Work Days)	Construction Equipment (Quantity)	Calculated Hourly Average L_{eq} (dBA) at Nearest Property Lines From Operation of Two Loudest Pieces of Construction Equipment at 50 feet and Acoustic Center of the Site				
		Noise Level at 50 feet	Residential Northwest (475 feet)	Commercial Southwest (225 feet)	Commercial East (750 feet)	Commercial Southeast (1,400 ft)
Trenching (98 days)	Excavator (1)* Tractor/Loader/Backhoe (1)*	78	58	61	54	49
Paving (56 days)	Paver (1) Roller (2) Grader (1)* Concrete/Industrial Saws (1)*	85	65	68	61	56
Building Foundation (55 days)	Excavator (1)* Tractor/Loader/Backhoe (1)*	78	58	61	54	49
Building Construction (730 days)	Crane (1) Forklift (1) Generator Set (1)* Tractor/Loader/Backhoe (1)*	82	62	65	58	53
Architectural Coating (365 days)	Air Compressor (1)*	74	54	57	50	45

*Denotes two loudest pieces of construction equipment per phase.

As shown in Tables 10 and 11, construction noise levels would intermittently range from 78 to 85 dBA L_{eq} when activities occur approximately 50 feet from nearby receptors, but would typically range from 55 to 64 dBA L_{eq} when focused near the center of the project site during the infrastructure phase and from 45 to 68 dBA L_{eq} when focused near the center of the townhome portion of the site. Construction noise levels would exceed the exterior threshold of 80 dBA L_{eq} at residential land uses to the west when activities occur within about 90 feet. Much of the noise would emanate from heavy equipment at or near ground level. Construction noise levels during the remaining phases of construction would not produce noise levels exceeding 80 dBA L_{eq} at residential land uses or 85 dBA L_{eq} at commercial land uses in the project vicinity. However, project construction is expected to last for a period of approximately 51 months. Since project construction would last for a period of more than one year and considering that the project site is within 500 feet of existing residential uses and within 200 feet of existing commercial uses, this temporary construction impact would be considered significant in accordance with Policy EC-1.7 of the City's General Plan.

Mitigation Measure 1a: Pursuant to General Plan Policy EC-1.7, a construction noise logistics plan shall be prepared that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses. Project construction operations shall use best available noise suppression devices and techniques including, but not limited to the following:

- Limit construction hours to between 7:00 AM and 7:00 PM, Monday through Friday, unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence. Construction outside of these hours may be approved through a development permit based on a site-specific "construction noise mitigation plan" and a finding by the Director of Planning Building and Code Enforcement that the construction noise mitigation plan is adequate to prevent noise disturbance of affected residential uses.

- Construct solid plywood fences or similar along the northwest boundary of the site adjacent to residences to shield adjacent residential land uses from ground-level construction equipment and activities. The temporary 8-foot noise barrier shall be solid over the face and at the base of the barrier in order to provide a 5 dBA noise reduction.

- Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

- Prohibit unnecessary idling of internal combustion engines.

- Locate stationary noise-generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors. Construct temporary noise barriers to screen stationary noise-generating equipment when located near adjoining sensitive land uses.

- Utilize "quiet" air compressors and other stationary noise sources where technology exists.

- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.
- Notify all adjacent business, residences, and other noise-sensitive land uses of the construction schedule, in writing, and provide a written schedule of "noisy" construction activities to adjacent land uses and nearby residences.
- Designate a "disturbance coordinator" who would be responsible for responding to any complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., bad muffler, etc.) and will require that reasonable measures be implemented to current the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

With the implementation of GP Policy EC-1.7, Zoning Code requirements, and the above measures, the temporary construction noise impact would be **less-than-significant**.

Impact 1b: **Permanent Noise Level Increase.** The proposed project is not expected to cause a substantial permanent traffic noise level increase at the existing noise-sensitive land uses in the project vicinity. **This is a less-than-significant impact.**

The only noise source proposed by the project that could potentially affect nearby residential land use is traffic accessing the project site. Vehicular access to the project site would be provided via two new private streets off Seely Avenue and one new private street off Epic Way. Seely Avenue is bookended by River Oaks Parkway to the northwest and Montague Expressway to the southeast. As such, vehicles approaching the project would access Seely Avenue either from Montague Expressway or River Oaks Parkway. Site access via Seely Avenue from Montague Expressway is currently limited to a right-turn-in and right-turn-out configuration. As a result, the project is proposing a new signalized intersection at the corner of Seely Avenue and Montague Expressway, which would create new left turns off of eastbound Montague Expressway onto northbound Seely Avenue, and from southbound Seely Avenue onto westbound Montague Expressway.

According to Policy EC-1.2 of the City's General Plan, a significant permanent noise increase would occur if the project would increase noise levels at noise-sensitive receptors by 3 dBA DNL or more where ambient noise levels exceed the "normally acceptable" noise level standard. Where ambient noise levels are at or below the "normally acceptable" noise level standard, noise level increases of 5 dBA DNL or more would be considered significant. The City's General Plan defines the "normally acceptable" outdoor noise level standard for the nearby residential land uses to be 60 dBA DNL. Existing ambient levels, based on the measurements made in the project vicinity, exceed 60 dBA DNL. Therefore, a significant impact would occur if traffic due to the proposed project would permanently increase ambient levels by 3 dBA DNL. For reference, a 3 dBA DNL noise increase would be expected if the project would double existing traffic volumes along a roadway.

The traffic study included peak hour turning movements at nine intersections in the project vicinity. A comparison of the existing traffic volumes and existing plus project traffic volumes was made, and the comparison indicated that the project would result in a 0 to 2 dBA DNL increase

along each roadway segment included in the traffic study (Table 12). Therefore, the project would not result in a permanent noise increase of 3 dBA DNL or more at noise-sensitive receptors in the project vicinity.

TABLE 12 Project-Generated Traffic Noise Increases

Roadway Segments	Existing Traffic Volume (PM Peak)	Existing Plus Project Traffic Volume (PM Peak)	Noise Level Increase (dBA, DNL)
Epic Way East of Seely Avenue	104	143	1
Seely Avenue Between River Oaks Parkway and Montague Expressway	566	841	2
River Oaks Parkway West of Seely Avenue	679	731	0
River Oaks Parkway East of Seely Avenue	591	710	1
Montague Expressway West of Seely Avenue	4596	4686	0
Montague Expressway East of Seely Avenue	4701	4885	0

Source: Seely Avenue Mixed-use Development Draft Transportation Analysis, Hexagon Transportation Consultants, Inc., May 3, 2022.

Noise generated by typical residential HVAC systems, the use of residential roof decks or the public park for outdoor enjoyment, commercial operations occurring on the project site, and the operation of the domestic water well would not be notable at the nearest residences opposite Epic Way. Individual residential HVAC systems would produce sound levels less than 40 dBA at 50 feet from the noise source assuming unshielded conditions. The use of residential roof decks or the public park for outdoor enjoyment and commercial operations, would occur over 800 feet from the nearest residences opposite Epic Way and would be shielded by intervening buildings or barriers. The proposed domestic water well would be located adjacent to Montague Expressway, and approximately 1,500 feet from the nearest residences opposite Epic Way. The primary noise source associated with the well would be the diesel generator. The generator would be tested periodically, typically for periods of less than one hour per day. Based on the noise data referenced in similar project studies[2], the type of generator that would likely be installed produces a noise level of 68 dBA at 21 feet. Assuming continuous operation of the generator over the one-hour testing period, the generator would yield a noise level of 31 dBA L_{eq} or less at the nearest residential uses opposite Epic Way. None of the above noise sources would be substantial community noise sources that would contribute to daily average noise levels at nearby sensitive receptors. This is a less-than-significant impact.

Mitigation Measure 1b: None required.

2 Trimble and Agnews Municipal Groundwater Wells Initial Study, City of San Jose, February 2021.

Impact 2: **Exposure to Excessive Groundborne Vibration.** Construction-related vibration levels are not expected to exceed applicable vibration thresholds at nearby sensitive land uses. **This is a less-than-significant impact.**

The construction of the project may generate perceptible vibration when heavy equipment or impact tools are used. Construction phases utilizing such equipment or tools would include demolition, site preparation, grading, trenching, building construction, and paving. Foundation construction techniques involving impact or vibratory pile driving equipment, which can cause excessive vibration, are not expected with the proposed project.

According to Policy EC-2.3 of the City of San José General Plan, a vibration limit of 0.08 in/sec PPV shall be used to minimize the potential for cosmetic damage to sensitive historical structures, and a vibration limit of 0.2 in/sec PPV shall be used to minimize damage at buildings of normal conventional construction. Cosmetic damage (also known as threshold damage) is defined as hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage is defined as hairline cracking in masonry or the loosening of plaster. Major structural damage is defined as wide cracking or the shifting of foundation or bearing walls. The vibration limits contained in this policy are conservative and designed to provide the ultimate level of protection for existing buildings in San José.

A review of the City of San José Historic Resource Inventory[3] identified no historic buildings in the site vicinity. For the purposes of this study, groundborne vibration levels exceeding the 0.2 in/sec PPV limit at the existing adjacent residences would have the potential to result in a significant vibration impact.

Table 13 presents typical vibration levels from construction equipment at 25 feet. Jackhammers typically generate vibration levels of 0.035 in/sec PPV and drilling typically generates vibration levels of 0.089 in/sec PPV at 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Table 13 also presents construction vibration levels calculated at the location of the nearest residential building about 50 feet away from the northwest site boundary. Vibration levels are highest close to the source, and then attenuate with increasing distance at the rate $(D_{ref}/D)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet. All other buildings are located over 50 feet from the project site. As indicated in Table 13, construction-related vibration levels would not exceed 0.2 in/sec PPV at the nearest structures. This is a less-than-significant impact.

3 City of San José Historic Resources Inventory
https://www.arcgis.com/apps/webappviewer/index.html?id=b2d7cc355a86493c8da904b8c2fc3e3e&extent=-13591970.1207%2C4462771.7617%2C-13533877.9792%2C4499308.6613%2C102100

TABLE 13 Vibration Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	PPV at 50 ft. (in/sec)
Clam shovel drop		0.202	0.094
Hydromill (slurry wall)	in soil	0.008	0.004
	in rock	0.017	0.008
Vibratory Roller		0.210	0.098
Hoe Ram		0.089	0.042
Large bulldozer		0.089	0.042
Caisson drilling		0.089	0.042
Loaded trucks		0.076	0.035
Jackhammer		0.035	0.016
Small bulldozer		0.003	0.001

Source: Transit Noise and Vibration Impact Assessment Manual, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, September 2018, as modified by Illingworth & Rodkin, Inc., June 2022.

Mitigation Measure 2: None required.

Impact 3: Excessive Aircraft Noise. The project site is located less than 2 miles from Mineta San José International Airport, but the noise environment attributable to aircraft is considered normally acceptable under the Santa Clara County ALUC noise compatibility policies for office land uses. This is a **less-than-significant** impact.

Mineta San José International Airport is a public-use airport located approximately 1.9 miles southwest of the project site. According to the Airport Master Plan Environmental Impact Report,[4] the project site lies outside the 60 dBA CNEL/DNL contour line (see Figure 11). According to Policy EC-1.11 of the City's General Plan, the required safe and compatible threshold for exterior noise levels would be at or below 65 dBA CNEL/DNL for aircrafts. Therefore, the proposed project would be compatible with the City's exterior noise standards for aircraft noise.

Assuming standard construction materials for aircraft noise below 60 dBA DNL, the future interior noise levels resulting from aircraft would be below 45 dBA DNL. Therefore, future interior noise at the proposed building would be compatible with aircraft noise. This would be a less-than-significant impact.

Mitigation Measure 3: None required.

[4] David J. Powers & Associates, Inc., Integrated Final Environmental Impact Report, Amendment to Norman Y. Mineta San Jose International Airport Master Plan, April 2020.

FIGURE 11 2037 CNEL Noise Contours for SJIA Relative to Project Site